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Sustainable Ecosystems Institute

**South Florida Ecosystem Restoration
Multi-Species Avian Workshop**

Scientific Panel Report II

Scientific Responses in relation to specific policy and
management questions



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SUSTAINABLE ECOSYSTEMS INSTITUTE

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The full set of publications and materials associated with this series of workshops are:
CD with copies of the scientific presentations from the first workshop March 17-18 2003
A transcript CD of the first workshop March 17-18 2003
First science panel report
Transcript of Second Workshop July 29 2003
This report.

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Background

Sustainable Ecosystems Institute, at the request of the Department of Interior and the South Florida Ecosystem Restoration Task Force, convened a multi-species avian summit to advance the science and restoration effort for the Everglades. The overall goal of this effort is to develop a common understanding of the science and make it available to all parties, including decision makers. As part of this process SEI established a panel of experts who were charged with evaluating technical issues and synthesizing information. Four bird species were identified as the focus of this initial multi-species approach, the Wood Stork, Snail Kite, Cape Sable Seaside Sparrow and Roseate Spoonbill



On March 17-18, 2003 in a first workshop was convened to present the relevant science and to evaluate information available. An expert panel of scientists was assembled to review and synthesize the findings. A full transcript of the presentations and discussions is available, and an initial report was produced by the science panel. On July 29, 2003 a second workshop was held in Key Largo to present the report and to allow the findings to be integrated into management and policy. This workshop provided managers and policy makers with the opportunity to ask questions. This report addresses questions posed during this workshop, and from managers, policymakers, and other interested groups. A transcript of the workshop is also available from SEI.

Scientific Responses in relation to specific policy and management questions

This report is presented as a series of responses to specific questions that were posed by managers, policy makers, and other interested groups. The first multi-species avian ecology workshop was convened to articulate and debate the science in order to reach

conclusions to key questions. One central question was whether CERP will in fact benefit the focal species or whether one will thrive at the expense of another. The first report addressed this issue by focusing on the likely impacts and success of a multi-species approach, anticipated impacts of CERP, vulnerability during transition, and addressing uncertainty and risk.

In the second workshop, the policymakers and managers attention focused more on the transition to CERP. What are the specific risks and what research and activities can be undertaken to minimize these short- and mid-term risks? *This follow up report focuses mainly on these issues.*

Questions 1 and 2 consider the overall impact of CERP. The remaining questions (3-13) concern primarily the short- to mid-term questions and needs. The questions were posed by a number of different policy makers, managers, and others. We have quoted them directly from transcripts or written questions, and/or combined questions into a single question.

1. Given the significant financial, scientific, technological, and social investment in CERP, is CERP likely to benefit these four focal species or will the conflicts among the species mean that one benefits at the expense of others? What's the basis for your conclusions?

The panel was provided with the best available science. Panel members listed to 34 scientific presentations by researchers actively working on these species and in this area, they read relevant scientific publications and reports, and engaged in active discussion with researchers and among themselves. (See also transcript of presentations and discussions). There was unanimous agreement among the panel members that CERP will benefit all four species, and that the multi-species approach will work. Although there is concern over conflicting needs, the panel found that in fact the reason that CERP will benefit all species is because they are diverse in their requirements and that a restored Everglades can support a sufficiently wide range of conditions that all four species can persist in the ecosystem. In addition to the scientific information, this conclusion is also based on the key assumption that CERP will result in sufficient amounts of all critical habitat types.



2. What about stress during the transition to CERP?

Transition stressors are likely. Thus monitoring and management flexibility are key during the transition. Due to their vagility, ability to find suitable habitat, and their long-lived nature, storks, spoonbills and kites all appear to be sufficiently resilient to withstand the transition without the need for major intervention. However, the sparrow is less resilient, and more proactive and interventionist management approach is likely to be needed during transition. This does not mean that the sparrow must then be put in conflict with the needs of the other species; rather it means that more attention and management action may be needed for this species. (See below for specific areas of research that will address transition issues)

3. This set of questions and responses relate specifically to data gaps in the short term, and what types of research needs to be carried out. Specific questions are:

What are the data gaps that we need to address, in the short term, before CERP is fully implemented? Specifically for the sparrow what research and analysis should we be doing over five years and ten years and so on? So, if there are data gaps with respect to how the ecosystem is going to respond, how do we address that? Are there specific research efforts that we need to be doing? What sort of research should we be doing to look at other causes for decline? Let's say that your assumption of hydroperiod was wrong, that doesn't mean that there aren't other factors that are contributing to the decline, which means that your assumption is wrong.

SPARROWS

While the reproduction, censusing and modeling of sparrows have received a lot of attention, other areas seem much less well developed. Movements seem key, yet only one short-term study has been carried out here. Movement is crucial for gene flow, and for assessing the potential for animals to disperse when conditions are poor in one part of the range. For example, although there were virtually no sparrows remaining in the territories of the eastern sub-population that were burned, there was no explanation as to whether those animals died, moved to nearby territories, or moved large distances. A large mark-resight program that involves a large proportion of the entire population would seem to be well suited to answering this questions, and possible given the small size of the population. The knowledge gained from such an exercise would seem to be well worth the disturbance to the birds.

Studies of the vegetation, and incorporation of vegetation into sparrow dynamics would also improve knowledge of the species' response to various factors.

A real information gap relates to how do sparrows respond, not during a normal year, but when they're subjected to an extreme event e.g., fire, flooding etc. One of the most important needs is to expand on intensive study plots and to study them in extreme conditions (e.g. population A). This can be carried out experimentally or by looking at the response of sparrows to a range of extreme events (e.g. flood conditions, fire etc). We do not feel that you are going to answer the key questions raised by simply recording changes in sparrow counts over time.

The flooding that was associated with poor sparrow reproduction does not seem to explain why populations have not rebounded as drier conditions have returned. Sparrow research needs to fully address the question of the causes of poor reproduction. We suggest that predation, disease, contaminants, food supply, habitat change, movements, inbreeding depression and other explanations need to be explored and discounted. This has not been carried out. Some of these factors e.g. predation lend themselves to study through intensive study plots. While hydrology has an undoubted role in sparrow ecology, there has been a tendency to consider hydrology and fire regimes as the only factors affecting sparrow populations. This sole explanation seems unlikely in the long run to explain sparrow population dynamics completely, and hypotheses about other effects should be generated and tested, especially those that seem to put the flooding hypothesis at risk. A study that relates sparrow production against habitat factors would be useful and this can be integrated with the intensive study plots.

Radio telemetry, with mark and re-sighting are techniques that provide good information about what is happening with populations in a transitional stress. However, the current mark and recapture techniques should be evaluated to determine if they are sufficient to provide the necessary information. For instance, more intensive, longer time period, and larger geographic scale studies would provide information on rare but critical events such as dispersal.

It is unlikely that the sparrow population will begin a steady increase from where they are now. It is likely that their numbers will decline in areas as CERP is implemented, and while habitat is being created that will ultimately allow sparrows to rebound. This may happen with the other species too, but with sparrow numbers already at low level, the panel feels that this is more problematical than for the other species.

Additional response to specific questions on "where and what for intensive study plots? See above. Other specific suggestions include: For population A, what is the demography. How good is reproduction and survival? The intensive studies need to be expanded beyond population B (where this is little hydrological or fire stress).

OTHER SPECIES AND STUDIES:

(i) Studies: We don't know as much about how to predict population responses for wood storks and spoonbills. These studies would provide useful information. However these are not essential in order to proceed with restoration.

(ii) In response to the question- The panel's initial report noted that the snail kite's resilience is due in part to its use of many non-Everglades sites, and thus it is unclear to what extent it is dependent on a south Florida component that might be unsuitable under transition for a period of years. Would you recommend research be focused to lessen this uncertainty?

Response:

The South Florida area and the Everglades in particular has been repeatedly shown to be a core breeding and wintering area for the kite. This species can survive Everglades drought years in areas outside the Everglades, but it's not clear that it could survive without the Everglades as a regular component of nesting habitat. Research in this area is recommended.

In general, studies on the relationship for strongly mobile species between Everglades populations and populations distributed outside the Everglades would be a fruitful area of research. It would provide important information for interpreting the causes of changes in abundance, distribution, reproduction etc. For instance, a decline in numbers of a particular species in the Everglades may not be due to a decline in habitat quality in the Everglades but may reflect an increase in habitat quality or quantity elsewhere (outside the Everglades).

(iii) Is there any concern for the other three species?

See above and in general the level of concern for the other three species is much less in the short term than for the sparrow. The other species are more resilient and they will most likely be able to deal with the transition even though there will be temporary poor conditions. However if the status quo continues this will be detrimental to the species.



In general, significant “ups and downs” in populations are a normal part of population dynamics and do not require management intervention. Only if there was a widespread and significant change e.g. a statewide major decline in snail kites, would changes in management be indicated.

(iv) Hydrological Models: Meeting the short- and long-term predictions of CERP rests largely on the accuracy and certainty of the hydrological models. A thorough review and evaluation of the models with respect to variance, accuracy, and certainty would help to define the risks associated with CERP and other activities. The problem with the hydrological predictions is the reliability particularly in the coastal regions most critical to several of these species. Understanding accurate hydrologic scenarios may not be particularly hard, especially in light of what is known about habitat requirement for these creatures. In addition frequency of success in reaching hydrological targets should be recognized as an underlying source of uncertainty. Incorporating this uncertainty and variance into the predictions would be beneficial. However, the panel cautions against “paralysis by analysis”.

Associated with this, the panel feels that more and better modeling of transition hydrology should be carried out. But implementation should not wait until this has been carried out.

(v) Hydrology-Vegetation linkage: The effects of hydrology on vegetation dynamics is much less well known and this aspect seems to lag far behind both hydrological modeling and an understanding of response to the focal species to habitat change. The hydrology-vegetation relationship is a key link in the chain from hydrology through to animal population viability, density and distribution. This linkage needs particular attention.

(vi) Full evaluation of different and transitional scenarios: CERP needs to be flexible, and we have not really considered this fully. Current studies compare present day conditions to full CERP implementation. We should consider looking at something less than full implementation or look at various stages along the way to full CERP.

(vii) See also research suggestions in question 11 below

(viii) Overall: One of the most important things to do is to begin implementing CERP and to learn by adaptive management from what occurs. We do not need to have fully resolved these issues discussed above and below in advance. Nor will we ever have perfect information. Indeed there is a good body of knowledge for these species. We

can benefit greatly, and advance the restoration effort by “learning by doing” (a key component of adaptive management)

4. *This set of questions and responses address minimizing risk to the sparrow and activities during transition. Specific question are:*

Given the fact that sparrows are fairly sedentary as I understand it, and the fact that the population sizes may go down, should we be looking at some sort of captive breeding program to supplement the wild population as a short-term measure, or an interim measure, as the next 20 years of CERP unfolds? This is particularly if we might be at risk of e.g. losing some of the populations during the transition. How do we minimize the risks associated with that? (This question was also posed in the following way: Given the uncertainty about the dispersal potential of the sparrow and apparent lack of resilience, can the panel recommend any research that can be conducted and then applied to reduce this uncertainty?) Should we do a risk assessment?

First, it seems entirely possible that the sparrow could be highly resistant to moving, except under extreme habitat degradation. Therefore conclusions from movement research must be based on time series of locations in which such degradation does occur- not simply ones which give the sparrows no obvious reason to move.

It is likely that some of the populations (western and eastern sparrow populations) could experience conditions that they haven’t experienced for some time, and there is uncertainty as to how they will react to these. It is likely that sparrows are going to have to shift their distribution somewhat to track the habitat.

(i) Translocation/reintroduction: Ultimately we may discover that the sparrow simply does not have the ability to move fast enough to keep ahead of ecosystem dynamics, particularly with the speed of human-influence restoration. This seems likely enough that we should plan on it at this point. We may end up finding, in fact, that there is a lot of appropriate habitat the sparrow is not using. Under both scenarios, a reintroduction would seem to be very useful both for understanding the sparrow better, and for ensuring its long-term survival. All endangered species reintroduction programs take time to work out the logistics, and it seems like this ought to be initiated now, rather than waiting for the sparrow population to get more critical (e.g. as happened with the Dusky Seaside Sparrow). There is ample evidence of successful reintroduction programs in many other critically endangered species as well as precedents for reintroduction in ENP specifically Brown-headed nuthatch, Eastern Bluebird. One possible approach for the sparrow is translocation between occupied sites as a test of the method. The panel encourages exploration of this technique at this time (i.e. before it becomes immediately urgent).

(ii) Captive Breeding: Captive breeding is a more risky undertaking, and a step of last resort. Prior to this translocation or reintroduction programs are preferable as a first step (see above)

5. At what point is low too low? At what point do we need to start translocation, captive breeding, and reintroductions?

A population viability analysis (PVA) is one way to determine how the risks to a population increase as its number decline, and to determine when along the trajectory to intervene (i.e. at very low numbers intervention can be risky). A PVA is a standard and established technique for assessing these questions and we recommend that a PVA be carried out for the sparrow. The PVA should look at all the populations, and should consider the risks to the populations if individuals are “removed” for translocation to help address when it is best to start a translocation or other activity (see above). In general the panel feels that is “a bad idea to have total faith in PVA but a very good idea to have the results”.



PVA could be used in an exploratory fashion. Previous efforts on PVA were either too simplistic or too complex, and not “parameterizable”. A suitable PVA requires using appropriate number of parameters that are linked to changes in habitat. The critical data will be survival estimates under various conditions. Again management decisions shouldn’t wait on completion of this analysis.

There is a history of variation in these populations. If there are four or five units and one of these drops to a low level, this should not indicate need for drastic action. However, if there is simultaneous decreases occurring everywhere then this is cause for concern, and a likely trigger for action. If the variation in the next few years looks like past variability then “drastic action” is unlikely to be needed.

A risk assessment in conjunction with PVA for the sparrow and a risk assessment in a broader context will be useful for integrating the data into management decisions.

6. Are these species good indicators? Should we be looking at other species?

Generally birds have mixed success as indicators. Members of the panel considered that these species are overall good indicators. However, some noted that some of the species have a long lag time (for detecting responses), and thus they are not sensitive to short-term changes. For these short-term changes other species may be useful to include. Species that are related to particular habitats of concern might be useful, for instance other species that inhabit marl prairie. Studying these might indicate whether changes in sparrow are due to intrinsic population factors, habitat or other factors. A species that could be considered for short-term responsiveness is the white ibis. The panel members also noted their own limitations in answering this question as their expertise is primarily around the focal species and not in other areas e.g. coastal invertebrates

However, the panel also noted that The Monitoring and Assessment Plan for CERP covers this in great detail and there has been good work carried out in this area that is included in the plan

7. Is there sufficient information to move forwards or do we need to gather other information on these species first?

While more information is always a positive, the panel felt strongly that there was sufficient information and that the data are of good enough to move forwards in implementing CERP and restoration. It is unusual to have this amount and quality of information in making these types of decisions. Delaying the implementation of Everglades restoration will not improve the status of these species.

The current situation is far from ideal. We have allowed considerable negative change to e.g. Tree Islands. Thus it is important that action be taken.

8. What can we do when “things go bad” and to avoid it happening?

Adaptive management is the best approach for evaluating and learning. Also studies and predictions based on pre-CERP and different stages of CERP (see above)

9. Is a thorough evaluation of potential trade-offs realistic given that the points identified may not be entirely predictable or known?

With regard to this effort, a thorough evaluation is taken to mean a scientific evaluation. The panel felt that there was sufficient information to predict the effects of hydrology on the species. However, for vegetation, the ability to predict habitat change is poor. The lack of interim and CERP hydrological scenarios limits the predictions that can be made with high levels of confidence.

10. For sparrows in particular, in order to achieve Everglades restoration, how much of what is deemed to be historic marl prairie can be converted to sawgrass (and still be restoration)?



In short there needs to be sufficient marl prairie to maintain viable populations of sparrows. However, this is an important unknown for the panel. The hydrological scenarios that were presented did not indicate whether or not sawgrass conversion would occur, since these scenarios only noted whether it would be wetter or drier than a base condition, and in many cases only indicated whether hydrological restoration conditions had been achieved or not. This highlights the issues of uncertainty in predicting vegetative change from hydrology, a key uncertainty. Our concern does not arise from any clear indication that sparrows will be flooded out by CERP- in fact, sparrow experts seem to agree that the final CERP target condition will be positive for sparrows. We only point out that there is sufficient uncertainty in both

hydrological predictions and vegetative response that hydrological conditions could end up degrading sparrow habitat. In the absence of detailed predictions, it is not unreasonable to assume that if CERP puts considerably more water down the Shark Slough drainage than is currently happening, conditions could get wetter for the sparrows they are now.

11. What are the pitfalls from CERP employing a passive adaptive approach with these species? If so, what specifically do you recommend to avoid these pitfalls?

CERP is not necessarily to be faulted for using passive adaptive management. The nature of the ecosystem (e.g., water behavior, widespread components, long time lag in response, wide-ranging species like birds) indicates that experiments be at such a large scale that the entire ecosystem must be involved. The main pitfall in such a learning environment is that we will not wait long enough to tell whether restoration activities are working or not. So the appropriate response for managers and scientists is to set up

a priori predictions about how long it will take various ecosystem attributes to respond in various restoration scenarios (including CERP targets and interim targets) Nonetheless, there are probably also important areas for smaller scale experimentation. Vegetative response, for example is one areas that badly needs attention, and from which relatively short term experiments and monitoring of key areas would allow enormous learning that would be relevant to the birds. Another key area is the dynamics of fish and aquatic invertebrate communities in relation to hydrology, particularly in a variety of habitats (coastal, transition, freshwater) of the Everglades where the largest impacts are likely to be felt. A final key area is further documentation of key life history patterns of the birds that will allow defensible models of population response- this is probably best developed for kites and to a lesser extent sparrows, but survival information is still lacking for storks and spoonbills.

There are however, opportunities for more active adaptive management in some of the projects including the hydrology. A more active approach would have more power (i.e. statistical power). Thus it would be possible to test more hypotheses, e.g. how hydrology affects vegetation and how structure affects hydrology.

12. Is it that you just can't manage for habitats because of the sparrow? Does the panel report suggest this?

No this is not what the panel report suggests. The major difficulties for the species will be alleviated by CERP. Getting more flow into the Southern Everglades will help the storks, spoonbills. Getting more sheet flow, and less build-up of water in water conservation areas will help the snail kites. But it is not simply that the species can just move around and adapt. Rather it is that the management changes that are forecast are what are needed to improve conditions for the species. For robust species, if conditions deteriorate temporarily, they can withstand this transition. For the sparrow there is agreement that long term CERP will benefit it. But if CERP were implemented, in the short-term the sparrow population will not begin to show immediate increases, but will in fact be more likely to decline. Thus the approaches and research suggested above are valid for the sparrow in the short term, but they do not imply a single-species management approach.



13. Do our recovery goals need to be looked at again?

This question was asked in relation to the trajectory of the species during transition. The key point is that during transition to CERP there may be initial declines in the species (particularly the sparrow). Thus the population level will go down and then back up. This should be expected. This transitional decline may be of consequence for the sparrow. A key issue for managers and policy makers is to be able to predict , evaluate and manage for the potential decline within the context of recovery. Thus, PVA, risk assessments, research proposed above etc. will provide valuable information that is needed in the short- to mid- term.

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